



Weigang Qiu, Professor of Biology

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Education:

- B.Sc. 1986, Biochemistry, Fudan University, China
- Ph.D. 1999, Ecology and Evolution, State University of New York at Stony Brook (with Dr

Dan Dykhuizen)

- Postdoc. 2002, Bioinformatics, University of Maryland Biotechnology Institute (with Dr Arlin Stoltzfus)

Research Interests:

- **Biological Questions.** I am interested in the **population genomics** of microbial species. The main focus of my lab is the comparative analysis of multiple genomes of the

Lyme disease pathogen

. The goals of my research include reconstructing the

history of worldwide diversification

of the Lyme disease bacteria, an understanding of the mechanisms of their genome evolution (e.g.,

the roles of recombination and natural selection

), and inference of

gene and genome functions

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- **My Research Approach** is **bioinformatics**, and more specifically, the computational and statistical testing of evolutionary hypotheses. Students learn and use modern computational tools such as relational database/SQL, Perl/BioPerl, and statistical computing with R.

Teaching and Curricular Development:

- BIOL 375. Molecular Evolution [[Fall 2012 Syllabus](#)]
- BIOL 425. Computational Molecular Biology [[Spring 12 Syllabus](#)]
- BIOL 470. Bioinformatics Summer Workshop [[2010 Syllabus](#)]
- BIOL 230. Microbiology [[Latest Syllabus](#)]
- [The QuBi Project](#) : Curricular Improvement in Quantitative Biology

Bioinformatics Tools:

- Borrelia Ortholog Retriever: Obtain ortholog alignments from 23 Borrelia spp genomes. Search by gene names and IDs.[[Web Link](#)]
- SimBac: A package for simulating bacterial genome evolution [[Hosted by SourceForge](#)]
- DNATweezer: A Perl wrapper of the BioPerl modules [[Hosted by SourceForge](#)]
- The Bio::Align::Graphics module [[Perl Doc](#)] [[Code](#)]

Recent Publications (2008-2012; Lab Members in Bold):

- See my [Google Scholar Profile](#) for a full publication list & citation statistics
- Casjens SR, Mongodin EF, **Qiu W-G**, Luft BJ, Schutzer SE, Eddie B. Gilcrease, Wai Mun Huang, Marija Vujadinovic, John K. Aron, **Levy C.**

Vargas

am Freeman

, Diana Radune, Janice F. Weidman, George I. Dimitrov, Hoda M. Khouri, Julia E. Sosa, Rebecca A. Halpin, John J. Dunn, Claire M. Fraser. (2012) Genome Stability of Lyme Disease Spirochetes: Comparative Genomics of *Borrelia burgdorferi* Plasmids. PLoS ONE 7(3): e33280. doi:10.1371/journal.pone.0033280

- Schutzer SE, Fraser-Liggett CM, **Qiu WG**, Kraiczy P, Mongodin EF, Dunn JJ, Luft BJ, Casjens SR (2012). Whole-Genome Sequences of *Borrelia bissettii*

, *Borrelia valaisiana*

, and

Borrelia spielmanii

. Journal of Bacteriology 194: 545-546.

- **Haven J, Vargas LC**, Mongodin EF, **Xue V, Hernandez Y, Pagan P**, Fraser-Liggett CM, Schutzer SE, Luft BJ, Casjens SR,

Qiu WG.

(2011). Pervasive Recombination and Sympatric Genome Diversification Driven by Frequency-Dependent Selection in

Borrelia burgdorferi

, the Lyme disease Bacterium. Genetics. 189:951-966.

- Chavadi SS, Stirrett KL, Edupuganti UR, Vergnolle O, Sadhanandan G, Marchiano E, **Martin C**

,
Qiu WG

, Soll CE, Quadri LE. (2011). Mutational and phylogenetic analyses of the mycobacterial *mbt*

gene cluster. J Bacteriol. 2011 Aug 26.

- **Weigang Qiu.** (2011). A Review of *Lyme Disease: The Ecology of a Complex System* by Richard S. Ostfeld. The Quarterly Review of Biology 86 (3): 241.

- Xie XF, **WG Qiu**, PN Liple. 2011. Accelerated and adaptive evolution of yeast sexual adhesins. Mol. Biol. Evol. 28 (11): 3127-37.

- Sherwood R. Casjens, Claire M. Fraser-Liggett, Emmanuel F. Mongodin, **Wei-Gang Qiu**, John J. Dunn, Benjamin J. Luft, and Steven E. Schutzer. (2011). Whole Genome Sequence of an Unusual

Borrelia burgdorferi Sensu Lato

Isolate. J. Bacteriology. 193:1489-1490.

- Schutzer, SE; Fraser-Liggett, CM; Casjens, SR; **Qiu, WG**; Dunn, JJ; Mongodin EF; Luft, BJ. (2011). Whole-Genome Sequences of Thirteen Isolates of *Borrelia burgdorferi*.

J. Bacteriology. 193:1018-1020.

- Wywial E, **Haven J**, Casjens SR, **Hernandez YA**, Singh S, Mongodin EF, Fraser-Liggett CM, Luft BJ, Schutzer SE, **Qiu WG.**

(2009). Fast, adaptive evolution at a bacterial host-resistance locus: The PFam54 gene array in *Borrelia burgdorferi*

. Gene. 445:26-37.

- Tran D, **Haven J, Qiu WG**, Polle JE. (2009). An update on carotenoid biosynthesis in algae: phylogenetic evidence for the existence of two classes of phytoene synthase. Planta. 229(3):723-9.

- Arva NC, Talbott KE, Okoro DR, Brekman A, **Qiu WG**, Bargonetti J. (2008). Disruption of the p53-Mdm2 complex by Nutlin-3 reveals different cancer cell phenotypes. Ethnicity and Disease. 18(S2):1-8.

- Qiu, WG; Bruno, JF; McCaig, WD; Xu, Y.; Livey, I.; Schriefer, ME; Luft, BJ. 2008. Wide distribution of a high-virulence borrelia burgdorferi clone in Europe and North America.

Emerging Infectious Diseases. 14(7):1097-1104. [Open Access] **Qiu, WG**; Bruno, JF; McCaig, WD; Xu, Y.; Livey, I.; Schriefer, ME; Luft, BJ. (2008). Wide distribution of a high-virulence

Borrelia burgdorferi

clone in Europe and North America. Emerging Infectious Diseases. 14(7):1097-1104. [Open Access]

- Otoo HN; Lee KG; **Qiu WG**; Lipke PN. (2008). *Candida albicans* Als adhesins have conserved amyloid-forming sequences. Eukaryotic Cell. 7 (5):776-82.